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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,225	11/12/2003	Steven T. Fink	071469-0305807	3533

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PILLSBURY WINTHROP SHAW PITTMAN, LLP
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EXAMINER	
LUND, JEFFRIE ROBERT	
ART UNIT	PAPER NUMBER
1763	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/02/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/705,225	FINK ET AL.	
	Examiner	Art Unit	
	Jeffrie R. Lund	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) *21-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-3, 7-9, 11-13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ookawa et al, US Patent 6,758,941 B1, in view of Takeuchi et al, US Patent 5,935,337, and Morgan et al, US Patent 6,290,863.

Ookawa et al teaches an electrode plate assembly that includes: a coated aluminum electrode 2A; mounting screws 9 coupled to the electrode; a coated aluminum electrode plate 2B comprising a plurality of gas injection holes 2D, and mounting holes configured and aligned with and coupled to the mounting screws 9 in order to couple the electrode plate to the electrode. Ookawa et al also teaches that the

gas injection holes can be arranged in any manner (column 7 lines 48-52). (Entire document, specifically, Figures 1 and 2)

Ookawa et al differs from the present invention in that Ookawa et al does not teach a plurality of replaceable gas injection orifices, having a diameter, shape, and length, and coupled to the plurality of gas injection holes, that the gas injection orifice is made from coated aluminum, or the number of screws.

Takeuchi et al teaches a showerhead (electrode plate) 16 that has a plurality of replaceable gas injection orifice 18 having a diameter, shape, and length, and welded to a plurality of gas injection holes. (Entire document, specifically, Figures 1, and 10-12)

Morgan et al teaches attaching a nozzle 18 to head 30 using one of equivalent known attaching means, specifically, chemical bonding, screw threads, welding, or other known attachment means. (Column 8 lines 55-63)

The motivation for replacing the electrode plate of Ookawa et al with the showerhead (electrode plate) of Takeuchi et al is to provide a means for controlling the temperature of the electrode plate as taught by Takeuchi et al, or to provide an alternate and equivalent means of introducing the process gas into the chamber.

The motivation for mounting the replaceable gas injection orifices of Takeuchi et al with screw threads or other more replaceable mounting means is to enable the easy replacement of the replaceable gas injection orifices of Takeuchi et al. Furthermore, it has been held that making elements separable is obvious (see *In re Dulberg* 329 USPQ 148).

The motivation for making the showerhead (electrode plate) and gas injection

orifices Takeuchi et al out of coated aluminum, as taught by Ookawa et al, is to provide a material of construction as required by Takeuchi et al but not disclosed.

The motivation for using three or more screws is to more securely hold the electrode plate to the electrode. Using eight screws is common.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the electrode plate of Ookawa et al with the showerhead (electrode plate) of Takeuchi et al, make the welded gas injection orifices more removably received by mounting the gas injection orifices with screw treads or the like as taught by Morgan et al; make the showerhead (electrode plate) and gas injection orifices out of coated aluminum as taught by Ookawa et al, and use three or more screws.

4. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ookawa et al, Takeuchi et al, and Morgan et al as applied to claims 1-3, 7-9, 11-13, and 20 above, and further in view of Nguyen, US Patent 6,565,661 B1.

Ookawa et al, Takeuchi et al, and Morgan et al differ from the present invention in that they do not teach that the diameter, shape, or length of the gas injection orifices varies, or that the flow is higher in the center or alternately higher at the edge.

Nguyen teaches a showerhead 14 in which the gas injection orifices vary in shape and length, and direct a higher flow rate to the edge. (Figure 6)

The motivation for varying the diameter, shape, or length of the gas injection orifices of Ookawa et al, Takeuchi et al, and Morgan et al is to optimize the flow of gas into the chamber and across the wafer. Varying the diameter, shape, or length of the

gas injection orifices is well known in the art, and the diameter, shape, or length of the gas injection orifices are commonly varied to achieve the desired flow as taught by Ookawa et al and Nguyen.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the flow by varying the diameter, shape, or length of the gas injection orifices in the apparatus of Ookawa et al, Takeuchi et al, and Morgan et al as taught by Ookawa et al and Nguyen.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ookawa et al, Takeuchi et al, and Morgan et al as applied to claims 1-3, 7-9, 11-13, and 20 above, and further in view of Legler et al, US Patent 6,155,524.

Ookawa et al, Takeuchi et al, and Morgan et al differ from the present invention in that they do not teach that the screws have a head region and the mounting holes of the electrode plate are keyhole slot recesses.

Legler et al teaches a keyhole locking system that includes a head 76 and a keyhole slot 38. (Entire document)

The motivation for replacing the screws of Ookawa et al, Takeuchi et al, and Morgan et al with the lock system of Legler et al is to provide an alternate and equivalent means of securing the electrode plate to the electrode.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the screws of Ookawa et al, Takeuchi et al, and Morgan et al with the lock system of Legler et al.

6. Claims 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Ookawa et al, Takeuchi et al, and Morgan et al as applied to claims 1-3, 7-9, 11-13, and 20 above, and further in view of Otsuki, US Patent Application Publication 2001/0003271 A1.

Ookawa et al, Takeuchi et al, and Morgan et al differ from the present invention in that they do not teach that the coated aluminum is coated with a III-column or a Lanthanon element.

Otsuki teaches coating parts of a plasma processing system that are exposed to plasma with a III-column or a Lanthanon element to protect the part from the plasma. Otsuki teaches all the claimed compounds. (Figure 3)

The motivation for coating the electrode, electrode plate, and the gas injection orifices of Ookawa et al, Takeuchi et al, and Morgan et al with a III-column or Lanthanon element is to protect the parts from the plasma as taught by Otsuki.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to coat the electrode, electrode plate, and gas injection orifices of Ookawa et al, Takeuchi et al, and Morgan et al with a III-column or Lanthanon element as taught by Otsuki.

7. Claims 1-3, 7-9, 11-13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ookawa et al, US Patent 6,758,941 B1, in view of Takeuchi et al, US Patent 5,935,337, and Hayashi et al, US Patent 5,962,085.

Ookawa et al teaches an electrode plate assembly that includes: a coated aluminum electrode 2A; mounting screws 9 coupled to the electrode; a coated aluminum electrode plate 2B comprising a plurality of gas injection holes 2D, and

mounting holes configured and aligned with and coupled to the mounting screws 9 in order to couple the electrode plate to the electrode. Ookawa et al also teaches that the gas injection holes can be arranged in any manner (column 7 lines 48-52). (Entire document, specifically, Figures 1 and 2)

Ookawa et al differs from the present invention in that Ookawa et al does not teach a plurality of replaceable gas injection orifices, having a diameter, shape, and length, and coupled to the plurality of gas injection holes, that the gas injection orifice is made from coated aluminum, or the number of screws.

Takeuchi et al teaches a showerhead (electrode plate) 16 that has a plurality of gas injection orifice 18 having a diameter, shape, and length, and welded to a plurality of gas injection holes. (Entire document, specifically, Figures 1, and 10-12)

Hayashi et al teaches a plurality of replaceable gas injection orifices 33 having a diameter, shape, and length, and screwed into a plurality of gas injection holes. (Figures 2, 3, and 8; column 10 lines 8-34)

The motivation for replacing the electrode plate of Ookawa et al with the showerhead (electrode plate) of Takeuchi et al is to provide a means for controlling the temperature of the electrode plate as taught by Takeuchi et al, or to provide an alternate and equivalent means of introducing the process gas into the chamber.

The motivation for replacing the welding coupling means of Takeuchi et al with the thread (screw) coupling means of Hayashi et al is to provide an alternate means of coupling the plurality of gas injection orifices to the plurality of gas injection holes and enable the quick replacement of an individual gas injection orifice to repair or optimize

the showerhead.

The motivation for making the showerhead (electrode plate) and gas injection orifices Takeuchi et al out of coated aluminum, as taught by Ookawa et al, is to provide a material of construction as required by Takeuchi et al but not disclosed.

The motivation for using three or more screws is to more securely hold the electrode plate to the electrode. Using eight screws is common.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the electrode plate of Ookawa et al with the showerhead (electrode plate) of Takeuchi et al, make the gas injection orifice removable as taught by Hayashi et al, make the showerhead (electrode plate) and gas injection orifices out of coated aluminum as taught by Ookawa et al, and use three or more screws.

8. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ookawa et al, Takeuchi et al, and Hayashi et al as applied to claims 1-3, 7-9, 11-13, and 20 above, and further in view of Nguyen, US Patent 6,565,661 B1.

Ookawa et al, Takeuchi et al, and Hayashi et al differ from the present invention in that they do not teach that the diameter, shape, or length of the gas injection orifices varies, or that the flow is higher in the center or alternately higher at the edge.

Nguyen teaches a showerhead 14 in which the gas injection orifices vary in shape and length, and direct a higher flow rate to the edge. (Figure 6)

The motivation for varying the diameter, shape, or length of the gas injection orifices of Ookawa et al, Takeuchi et al, and Hayashi et al is to optimize the flow of gas

into the chamber and across the wafer. Varying the diameter, shape, or length of the gas injection orifices is well known in the art, and the diameter, shape, or length of the gas injection orifices are commonly varied to achieve the desired flow as taught by Ookawa et al and Nguyen.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the flow by varying the diameter, shape, or length of the gas injection orifices in the apparatus of Ookawa et al, Takeuchi et al, and Hayashi et al as taught by Ookawa et al and Nguyen.

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ookawa et al, Takeuchi et al, and Hayashi et al as applied to claims 1-3, 7-9, 11-13, and 20 above, and further in view of Legler et al, US Patent 6,155,524.

Ookawa et al, Takeuchi et al, and Hayashi et al differ from the present invention in that they do not teach that the screws have a head region and the mounting holes of the electrode plate are keyhole slot recesses.

Legler et al teaches a keyhole locking system that includes a head 76 and a keyhole slot 38. (Entire document)

The motivation for replacing the screws of Ookawa et al, Takeuchi et al, and Hayashi et al with the lock system of Legler et al is to provide an alternate and equivalent means of securing the electrode plate to the electrode.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the screws of Ookawa et al, Takeuchi et al, and Hayashi et al with the lock system of Legler et al.

10. Claims 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ookawa et al, Takeuchi et al, and Hayashi et al as applied to claims 1-3, 7-9, 11-13, and 20 above, and further in view of Otsuki, US Patent Application Publication 2001/0003271 A1.

Ookawa et al, Takeuchi et al, and Hayashi et al differ from the present invention in that they do not teach that the coated aluminum is coated with a III-column or a Lanthanon element.

Otsuki teaches coating parts of a plasma processing system that are exposed to plasma with a III-column or a Lanthanon element to protect the part from the plasma. Otsuki teaches all the claimed compounds. (Figure 3)

The motivation for coating the electrode, electrode plate, and the gas injection orifices of Ookawa et al, Takeuchi et al, and Hayashi et al with a III-column or Lanthanon element is to protect the parts from the plasma as taught by Otsuki.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to coat the electrode, electrode plate, and gas injection orifices of Ookawa et al, Takeuchi et al, and Hayashi et al with a III-column or Lanthanon element as taught by Otsuki.

11. Claims 1-3, 7-9, 11-13 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ookawa et al, US Patent 6,758,941 B1, in view of Carducci et al, US Patent Application Publication 2003/0037880 A1.

Ookawa et al teaches an electrode plate assembly that includes: a coated aluminum electrode 2A; mounting screws 9 coupled to the electrode; a coated

aluminum electrode plate 2B comprising a plurality of gas injection holes 2D, and mounting holes configured and aligned with and coupled to the mounting screws 9 in order to couple the electrode plate to the electrode. Ookawa et al also teaches that the gas injection holes can be arranged in any manner (column 7 lines 48-52). (Entire document, specifically, Figures 1 and 2)

Ookawa et al differs from the present invention in that Ookawa et al does not teach a plurality of replaceable gas injection orifices, having a diameter, shape, and length, and coupled to the plurality of gas injection holes, that the gas injection orifice is made from coated aluminum, or the number of screws.

Carducci et al teaches a liner (electrode plate) 134 that has a plurality of replaceable gas injection nozzles 350a-350f having a diameter, shape, and length, and coupled a plurality of gas injection holes. The liner is made from aluminum, aluminum coated with AlO_3, silicon nitride, or alumina, and the nozzles are made from silicon, quartz, silicon carbide, and sapphire. (Entire document, specifically, Figures 2, 4, and 7A-12; and paragraphs 0099-0116)

The motivation for replacing the electrode plate of Ookawa et al with the liner (electrode plate) of Carducci et al or adding the nozzles of Carducci et al to the electrode of Ookawa et al is to provide a means for optimizing the direction and flow of the gases injected into the processing chamber as taught by Carducci et al, or to provide an alternate and equivalent means of introducing the process gas into the chamber.

The motivation for making the gas injection nozzles Carducci et al out of coated

aluminum, as taught by Ookawa et al, is to provide an alternate material of construction.

The motivation for using three or more screws is to more securely hold the electrode plate to the electrode. Using eight screws is common.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the electrode plate of Ookawa et al with the liner (electrode plate) of Carducci et al or add the nozzles of Carducci et al to the electrode of Ookawa et al, make the nozzles out of coated aluminum as taught by Ookawa et al, and use three or more screws.

12. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ookawa et al and Carducci et al as applied to claims 1-3, 7-9, 11-13, and 17-20 above, and further in view of Nguyen, US Patent 6,565,661 B1.

Ookawa et al and Carducci et al differ from the present invention in that they do not teach that the diameter, shape, or length of the gas injection orifices varies, or that the flow is higher in the center or alternately higher at the edge.

Nguyen teaches a showerhead 14 in which the gas injection orifices vary in shape and length, and direct a higher flow rate to the edge. (Figure 6)

The motivation for varying the diameter, shape, or length of the gas injection orifices of Ookawa et al and Carducci et al is to optimize the flow of gas into the chamber and across the wafer. Varying the diameter, shape, or length of the gas injection orifices is well known in the art, and the diameter, shape, or length of the gas injection orifices are commonly varied to achieve the desired flow as taught by Ookawa et al and Nguyen.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the flow by varying the diameter, shape, or length of the gas injection orifices in the apparatus of Ookawa et al and Carducci et al as taught by Ookawa et al and Nguyen.

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ookawa et al and Carducci et al as applied to claims 1-3, 7-9, 11-13, and 17-20 above, and further in view of Legler et al, US Patent 6,155,524.

Ookawa et al and Carducci et al differ from the present invention in that they do not teach that the screws have a head region and the mounting holes of the electrode plate are keyhole slot recesses.

Legler et al teaches a keyhole locking system that includes a head 76 and a keyhole slot 38. (Entire document)

The motivation for replacing the screws of Ookawa et al and Carducci et al with the lock system of Legler et al is to provide an alternate and equivalent means of securing the electrode plate to the electrode.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the screws of Ookawa et al and Carducci et al with the lock system of Legler et al.

14. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ookawa et al and Carducci et al as applied to claims 1-3, 7-9, 11-13, and 17-20 above, and further in view of Otsuki, US Patent Application Publication 2001/0003271 A1.

Ookawa et al and Carducci et al differ from the present invention in that they do

not teach that the coated aluminum is coated with a III-column or a Lanthanon element.

Otsuki teaches coating parts of a plasma processing system that are exposed to plasma with a III-column or a Lanthanon element to protect the part from the plasma. Otsuki teaches all the claimed compounds. (Figure 3)

The motivation for coating the electrode, electrode plate, and the gas injection orifices of Ookawa et al and Carducci et al with a III-column or Lanthanon element is to protect the parts from the plasma as taught by Otsuki.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to coat the electrode, electrode plate, and gas injection orifices of Ookawa et al and Carducci et al with a III-column or Lanthanon element as taught by Otsuki.

Response to Arguments

15. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

16. Applicant's arguments filed November 17, 2006 have been fully considered but they are not persuasive.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Hayashi et al is combined with two other references and clearly teaches

removable gas injection nozzles. The applicant has ignored the teachings of Ookawa et al and Takeuchi et al when arguing the use of Hayashi et al.

In regard to the arguments that Carducci et al is not an electrode, the Examiner disagrees. The Applicant cites paragraph 180 and the RF generator as evidence that Carducci et al is not an electrode. The RF generator is attached to a plate 2920 which is attached to the aluminum liner 134 makes the aluminum liner 134 an electrode. Furthermore, in figures 1, 2, 21, and 28 the liner 134 acts as a ground electrode for the RF generator attached to the electrode 105 of the wafer support.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (6:30 am-6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Jeffrie R. Lund
Primary Examiner
Art Unit 1763

JRL
7/11/06